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| APPLICATION NO.                                                            | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|----------------------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 09/929,738                                                                 | 08/13/2001  | Emilio Casaccia      | CISCP686            | 9020             |
| 26541                                                                      | 7590        | 01/20/2004           | EXAMINER            |                  |
| RITTER, LANG & KAPLAN<br>12930 SARATOGA AE. SUITE D1<br>SARATOGA, CA 95070 |             |                      | HUGHES, DEANDRA M   |                  |
|                                                                            |             |                      | ART UNIT            | PAPER NUMBER     |
|                                                                            |             |                      | 3663                |                  |

DATE MAILED: 01/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/929,738

Applicant(s)

CASACCIA ET AL.

Examiner

Deandra M Hughes

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 44-64 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 45,50,51,53,54 and 58-63 is/are rejected.
- 7) ☒ Claim(s) 46-49, 52, 55-57, 64 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Declaration*

1. Due to the Declaration under Rule §131, the previous rejection is withdrawn.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 45, 50-51, 54, and 60-62 are rejected under 35 U.S.C. 102(e) as being anticipated by Christodoulides (US 6,388,800 filed Jun. 30, 2000).

\*\* For applicant's convenience, the Examiner has labeled the segments and their respective ends, as it reads on the claim language, in **Figure 12** of Christodoulides.

- a pump system disposed to inject optical pump energy ( $\lambda_p$ ) into a first end (*1<sup>st</sup> end from 64 to 70*) of a first fiber segment ( $L_2$ ) so as to counter-propagate relative (*pump travels from 64 to 62 and signal travels from 62 to 64*) to an optical signal ( $\lambda_s$ ) traversing said first fiber segment and a second fiber segment ( $L_1$ ); and
- an optical filter structure (66) coupled to a second end (*between 70 and 78*) of said first fiber segment ( $L_2$ ) and a first end (*between 76 and 68*) of said second fiber segment ( $L_1$ ); and

- wherein said optical signal ( $\lambda_s$ ) propagates through said optical filter (66) structure from said second fiber segment ( $L_1$ ) to said first fiber segment ( $L_2$ ), said optical pump energy ( $\lambda_p$ ) propagates through said filter structure from said first fiber segment to said second fiber segment, and said optical filter structure substantially blocks energy at a frequency of said optical signal (*col. 6, lines 40-50*) from traveling from said first fiber segment into said second fiber segment so that Raman amplification is induced in said first fiber segment and said second fiber segment and double Rayleigh backscattering effects are ameliorated (*col. 6, line 52*).

With regard to claim 50, Christodoulides discloses an isolator (*fig. 12, #80*) coupled to a second end (*between 70 and 78*) of a said first fiber segment ( $L_2$ ) and configured to pass optical energy ( $\lambda_s$ ) into said first fiber segment ( $L_2$ ) via said second end (*between 70 and 78*) and block optical energy (*optical noise, col. 6, line 48*) from exiting said second fiber segment ( $L_1$ ) via said second end (*between 68 and 62*).

With regard to claim 51, the first segment is  $L_2$  and the second segment is  $L_1$ .

With regard to claim 54, Christodoulides discloses:

- injecting optical pump energy ( $\lambda_p$ ) into a first end (*1<sup>st</sup> end from 64 to 70*) of a first fiber segment ( $L_2$ ) so that said optical pump energy counter-propagates (*pump travels from 64 to 62 and signal travels from 62 to 64*) relative to an optical signal ( $\lambda_s$ ) traversing said first fiber segment ( $L_2$ ) and a second fiber segment ( $L_1$ );

- passing said optical signal ( $\lambda_s$ ) from said second fiber segment into a second end of said first fiber segment;
- passing said optical pump energy from said first fiber segment ( $L_2$ ); into said second fiber segment ( $L_1$ ); and
- blocking optical energy at a frequency of said optical signal (col. 6, lines 40-50) from entering said second fiber segment ( $L_1$ ) from said first fiber segment ( $L_2$ ).

With regard to claim 60, Christodoulides discloses:

- means for injecting optical pump energy ( $\lambda_p$ ) into a first end (*1<sup>st</sup> end from 64 to 70*) of a first fiber segment ( $L_2$ ); so that said optical pump energy ( $\lambda_p$ ) counter-propagates (*pump travels from 64 to 62 and signal travels from 62 to 64*) relative to an optical signal ( $\lambda_s$ ) traversing said first fiber segment ( $L_2$ ) and a second fiber segment ( $L_1$ );
- wavelength-selective means (82) for reflecting optical energy at a frequency of said pump energy , optical energy at a frequency of said optical signal being absorbed by said wavelength-selective reflecting means (*col. 6, lines 35-60*); and
- means for directing optical energy (66) exiting a first end (*between 76 and 68*) of said second fiber segment ( $L_1$ ) into a second end (*between 70 and 78*) of said first fiber segment ( $L_2$ ) , for directing optical energy exiting said second end (*between 70 and 78*) of said first fiber segment ( $L_2$ ) into said wavelength-selective reflecting means (66), and for directing optical

energy reflecting from said wavelength-reflective means into said first end  
(between 76 and 68) of said second fiber segment ( $L_1$ ).

With regard to claim 61, the wavelength-selective reflecting means comprises a fiber Bragg grating (82 and col. 2, line 14).

With regard to claim 62, the directing means comprises a 3-port circulator (76).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 53, 59, and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christodoulides' Figure 12 in view of Christodoulides' Figures 9 and 17. Christodoulides' Figure 12 does not specifically disclose pump signals of two different frequencies. However, Figure 9 teaches that Raman amplification occurs in optical signals that are pumped by a frequency approximately 13.2 THz away. Fig 17 teaches amplifying a multiplicity of optical signals of different frequencies by pumps of different frequencies. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use pump signals of different frequencies for the advantage of Raman amplifying a multiplicity of optical signals of different frequencies.

6. Claim 58 is rejected under 35 U.S.C. 103(a) as being unpatentable over Christodoulides in view of Hecht (Understanding Fiber Optics, 1993). Christodoulides does not specifically disclose employing an isolator to block the optical pump energy

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from exiting a second end of a second fiber segment while permitting said optical signal to enter second end of said second fiber segment. However, Hecht teaches, as it is well known in the art, the use of isolators for attenuating light passing in the wrong direction (pg. 234, last paragraph). It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ an isolator for blocking optical pump energy from exiting the second end of the fiber for the advantage of reducing noise.

### ***Claim Objections***

7. Claim 51 is objected to because it does not further limit the parent claim (45). Claim 45 claims the first fiber segment and the second fiber segment. Claim 51 also claims the first fiber segment and the second fiber segment. Appropriate correction is required.

### ***Allowable Subject Matter***

8. Claims 46-49, 52, 55-57, and 64 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With regard to claims 46-49, the prior art does not teach or make obvious the claimed filter structure of claim 46.

With regard to claim 52, the prior art does not teach or make obvious the claimed filter structure in conjunction with a third Raman amplifying fiber segment.

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With regard to claim 55, the prior art does not teach or make obvious "passing said optical signal from a first end of second fiber segment into a second port of a *circulator*".

With regard to claim 56, the prior art does not teach or make obvious passing an optical pump energy from "said second end of said fiber segment into a third port of a circulator and out a first port of said circulator".

With regard to claim 57, the prior art does not teach or make obvious passing optical energy "at said frequency of said optical signal into a third port of a circulator."


With regard to claim 64, the prior art does not teach or make obvious a wavelength-selective reflecting means comprising two fiber Bragg gratings of different frequencies.

### ***Conclusion***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Deandra M Hughes whose telephone number is 703-306-4175. The examiner can normally be reached on M-F, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas G Black can be reached on 703-305-9707. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.

  
DMH

  
THOMAS G BLACK  
INTERVIEWS PATENT EXAMINER  
GROUP 3000